

Death in the suburbs: mortality in London and its hinterland between 1550 and 1700

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By 1700 each of London's suburbs had a population of at least 10,000 inhabitants, rivalling or exceeding that of the largest English cities and often still contained within a single parish (for example, only Norwich's 30,000 inhabitants and Bristol's 21,000 exceeded the 20,000 souls found in the parish of St Botolph Aldgate by 1710). The suburbs were the main focus of growth, where land was more readily available and economic activities less stringently controlled by civic or guild authorities, but the central city area remained vitally important for trade. Despite an extremely hazardous disease environment, the metropolis continued to grow from in-migration. During the sixteenth and seventeenth century both international and English born migrants flocked to London, working in new or expanding manufactures (such as gunmaking, brewing, silk manufacture), supporting the growing population by selling food or services, or working as domestic servants. Others came to market to keep the city supplied with meat, grains, fruit and vegetables, or shipped in fuel and raw materials. In a city periodically ravaged by plague, and subject to rising levels of infant mortality, many of these incomers and their children did not survive for long. Moving home was a frequent occurrence, and very few adults who did persist for a long time in one area had been born there.

This paper will contrast the mortality of early modern Londoners in the still-urbanising northern suburb of Clerkenwell, the built-up, partly riverside eastern suburb of Aldgate, and a predominantly mercantile sample population from the city centre. Other populations from the still-rural hinterland surrounding the metropolis may also be considered, to investigate the geographical scope of London's effect. Using church records, we can trace patterns of life and death in each of these areas. While the wealth and living conditions of inhabitants in the city and suburbs differed markedly, commerce and entertainments brought Londoners together on a daily basis. In this fluid and ever-changing environment, to what extent was there a convergence in the short-term experience of mortality, both before and after the last plague year of 1665? We will also explore the long-term trends in mortality among infants and children in London.

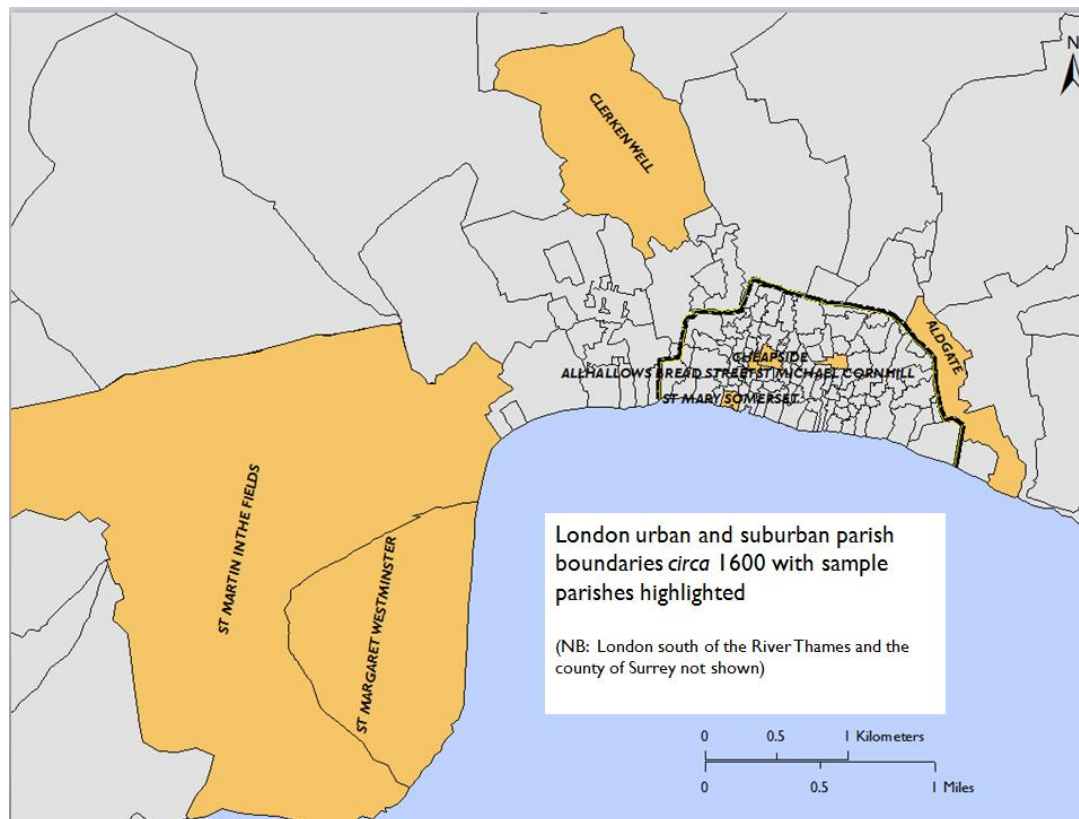
The extent of the metropolis and its effect on mortality

An inescapable difficulty when considering London as a whole is the number and complexity of administrative units comprising the metropolis and the rapid rate of its expansion, both in terms of its physical extent and its population. London is, of course, not one city but two: London and Westminster, and it encompasses lands south of the river Thames as well as to the north. The basic administrative unit of early modern England as a whole was the ecclesiastical parish, and London was not one parish but somewhere between one and two hundred parishes, depending on where and when one draws the boundary. These parishes varied hugely in physical size, number of inhabitants, social composition and extent of urban development. For the heart of the city, cutting across parish boundaries, there are also the 25 or 26

wards of London, ancient administrative units under civic control. Extra-parochial areas exempt from civic and/or the usual ecclesiastical authorities also abound.

This complexity, coupled with the sheer size of individual suburban parishes and the amount of work involved in reconstituting families from tens of thousands of baptisms, burials and marriages means that our analysis is necessarily restricted to a sample of London parishes. Those portions of this paper that deal with infant and child mortality are drawn from family reconstitutions of the large eastern suburb of Aldgate, the large north western suburb of Clerkenwell and five small parishes in the Cheapside area of central, intramural London (see Figure 1). Generally, Southwark and London south of the River Thames are not represented. However, after 1650, Landers' Quaker family reconstitution provides some comparative data that includes Southwark, since about two-thirds of Quaker-registered vital events came from the Southwark Meeting.¹ Analysis of annual totals of burials further includes Finlay and Shearer's counts of events from the small central, intramural parishes of St Mary Somerset, St Michael Cornhill and Allhallows Bread Street, and the large suburban parishes of St Margaret Westminster and St Martin in the Fields, together with the following parishes in the Middlesex hinterland: Stratford Bow, Tottenham, Edmonton, Enfield, South Mimms, Kensington, Harrow, Heston, Isleworth and Twickenham (see Figure 2).²

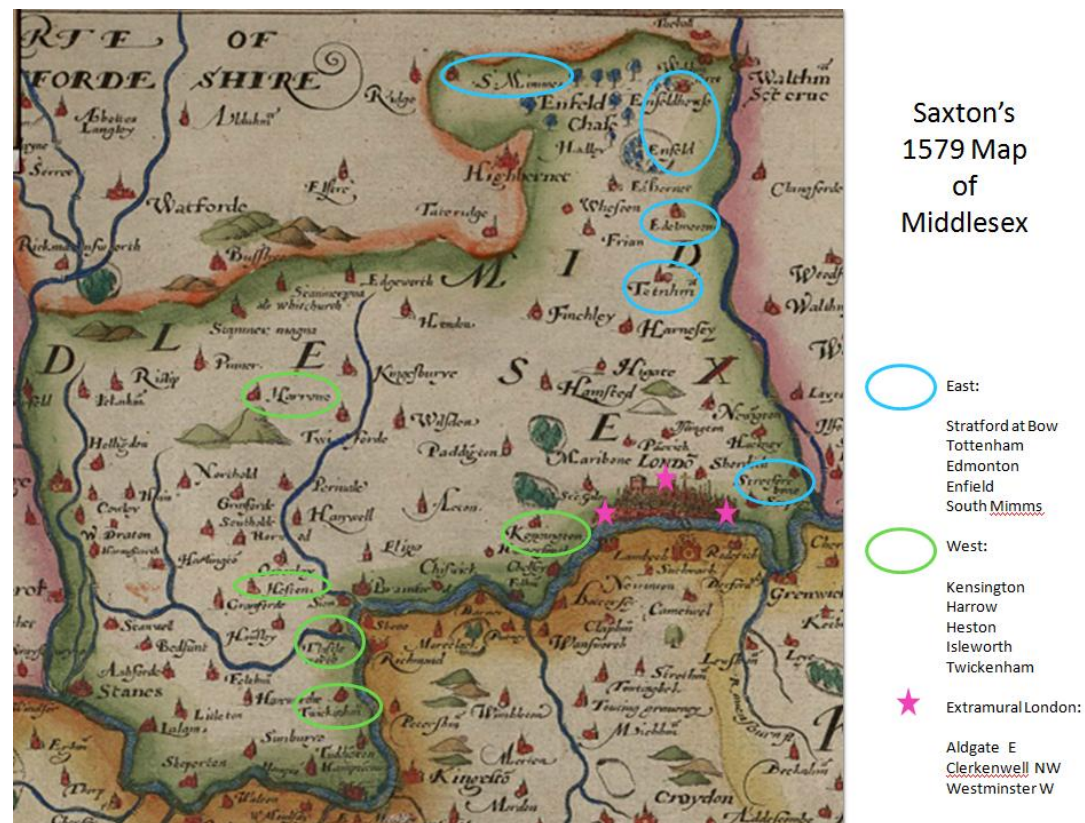
Figure 1: London sample parishes



¹ John Landers: *Death and the metropolis*, Cambridge University Press (1993) p. 134 Table 4.1

² These parishes are listed in Roger Finlay and Beatrice Shearer: 'Population growth and suburban expansion', in A L Beier and Roger Finlay (eds): *The making of the metropolis: London 1500-1700*, Longman (1986), p. 58-59.

Figure 2: Sample parishes in Middlesex and London



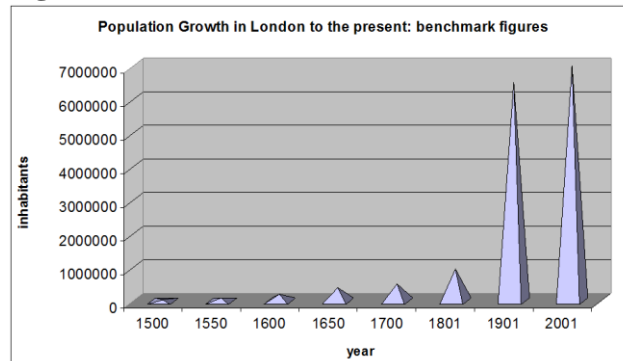
Migration and London's population growth

London's population growth and urban expansion throughout the early modern period can be dwarfed by the later phenomenal expansion of the nineteenth and early twentieth centuries (see Figure 3). However, it is important to remember the exceptional nature of the metropolis in the seventeenth century, especially after 1650 when London continued to grow even as the overall English population stagnated or shrank, and this despite the fact that cities were very unhealthy and hazardous places to live, especially for infants and children. Most of this population growth was a consequence of continuous large-scale migration to the metropolis from elsewhere in England, and those who had newly arrived to London settled predominantly in the suburbs rather than the walled city. Indeed, the city centre stagnated in population terms after 1650, and migration to the suburbs was the driver of population growth. The suburbs had the advantages of cheaper rents, closer proximity to the rural hinterland, and often partial immunity from taxation and regulation of mercantile activities.

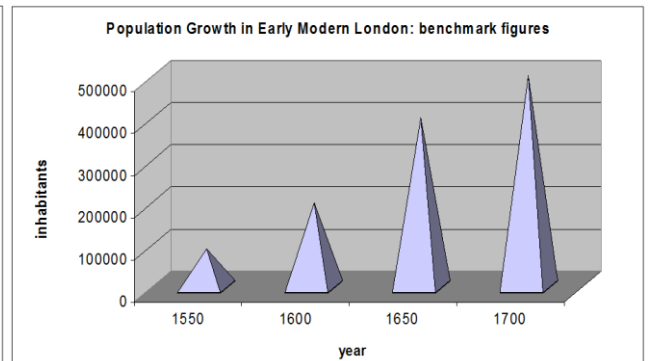
The economic attraction of London, and probably the push of deteriorating living standards in the countryside, propelled the most mobile social groups to the metropolis, young adults in particular, with many women arriving to enter domestic service. The health penalties of living in London were high. Many succumbed to disease before they could marry and bear children, but those that did succeed in starting a family had to watch their children suffer the health penalties of living in

densely populated, unsanitary conditions: an ideal environment for pathogens. The London Bills of Mortality attest to the lack of natural increase in London, for annual totals of burials consistently outstripped those of baptisms. Replenishment of population after the deaths of thousands of inhabitants occasioned by regular outbreaks of epidemic disease was very swift. The annual baptisms total generally recovered to pre-epidemic levels within 2 or 3 years of the outbreak, and scrutiny of the baptisms registers for central city parishes reveals that after the Great Fire of London in 1666, which destroyed much of the city within the walls, reoccupation took place at a similar rate.

Figure 3 (a)



(b)



Sources: Figures for 1500 to 1700 from Keene, D, 'Growth, Modernisation and Control: The Transformation of London's Landscape, c.1500–c.1760' in Clark, P and Gillespie, R, eds: *Two Capitals: London and Dublin 1500-1840*, Oxford University Press, 2001, p7-8. 1801 to 2001 figures taken from the Census abstracts for those years.

International migration had been an important factor in encouraging prior growth in sixteenth century London, when highly skilled Huguenots and other religious or political refugees from continental Europe settled particularly in the suburbs and other areas of the metropolis outside the reach of guild controls. In the 1550s the proportion of aliens resident in London was perhaps as high as 1 in 8 persons, but it had fallen to 1 in 20 by the close of the sixteenth century.³ Nonetheless, the economic stimulus of the skills and trades these international migrants brought with them was still strongly felt. In the eastern suburb of Aldgate, for example, gun making, beer brewing and luxury cloth production had been introduced by alien craftsmen. Silk thread twisting and weaving in particular were still rising in importance in the first half of the sixteenth century. A silk thread mill was built in the early 1600s, and between the 1590s and the 1640s, the number of baptisms in the parish registers of St Botolph Aldgate where the father was a weaver grew from 68 to 368 (there is little occupational information recorded post-1640). Of course, rapid population growth meant that annual totals of baptisms had risen considerably by the later date, but in relative terms the proportion of adult males who were weavers had still more than doubled, increasing from 4% to 9% of baptisms where the father is ascribed an occupation (which in these decades applies to 87% and 94% of all baptisms respectively).

³ Lien Bich Luu: *Immigrants and the Industries of London 1500-1700*, Ashgate 2005, p. 92

Economic and social characteristics of the sample parishes

This section primarily concerns the characteristics of those parishes for which family reconstitutions have been constructed and which have been used for the analysis of infant and child mortality. That is, the eastern suburb of Aldgate, the north western suburb of Clerkenwell, and the five Cheapside sample parishes from the centre of the walled city. Other London and Middlesex parishes form part of research in progress on short-term mortality variations throughout England, and their characteristics have not been explored in as much detail.

St Botolph Aldgate was a poor parish, especially in the back allies off the main thoroughfare of the Minories, and in the East Smithfield liberty furthest from the city wall and leading down to the Thames. By 1600 the parish was already almost fully urbanised, with some open space remaining at Brewhouse Fields in the East Smithfield liberty. In the first half of the sixteenth century parish officials were conscious of declining fortunes. Churchwardens lamented the removal of wealthy inhabitants and the small contributions to the poor rate that were all its inhabitants could muster. Poor law accounts referred to in the Vestry Minutes confirm that the parish was a net receiver of the poor rate throughout the seventeenth century. Broadly speaking, the economic activity of Aldgate inhabitants at this time was a mosaic of mostly small-scale manufacture, construction work and food retail, with a number of sailors in the East Smithfield portion of the parish abutting the River Thames. Unlike the wealthy central city parishes of Cheapside, there were few domestic servants, but several innholders and their employees catered to those sojourning in London, having arrived along the broad sweep of Whitechapel Road that led from Stepney and the county of Essex further east. Merchant tailors and brewhouse owners led the administrative affairs of the parish, but they were not a large group within the overall population. The wealthy drapers, factors and mercers that dominated the Cheapside parishes were almost entirely absent. In 1638 only 1% of Aldgate households were paying £20 per annum or more in rent and could be classed as substantial, whereas nearly half (46%) of households in the largest Cheapside parish of St Mary le Bow were in this category, and other Cheapside parishes had even higher proportions of wealthy households.⁴ Not all central city parishes were as wealthy as Cheapside. In our riverside sample parish of St Mary Somerset, only 8% of households were substantial.

In the northern suburb of Clerkenwell, less evidence on the status and wealth of inhabitants survives, especially for the first half of the seventeenth century. In the 1690s, household rents were lower than the median for London as a whole, but higher than those of Aldgate.⁵ The urban part of the parish comprised two main thoroughfares, converging on Smithfield cattle market, Turnmill Street and St John's Street, and the V-shape of land between them. The allies and courts off Turnmill Street had very cheap rents, being in close proximity to slaughterhouses and the insalubrious Fleet River, which meandered sluggishly along the western boundary and appears to have been used as an open sewer. St John's Street was more prosperous,

⁴ Percentages taken from Roger Finlay: *Population and Metropolis: The Demography of London 1580-1650*, Cambridge University Press (1981) p. 168-171 (Table A3.1). The proportions rated at £20 or more in other Cheapside sample parishes are as follows: Allhallows Honey Lane 56%, St Pancras Soper Lane 56%, St Mary Colechurch 44% and St Martin Ironmonger Lane 37%

⁵ Craig Spence: *London in the 1690s: a social atlas*, Centre for Metropolitan History (2000), p.108

and more substantial dwellings yet were to be found towards the centre of the parish where the built-up area gave way to gardens. The built-up portion of the parish was at the southern, city end, and much of the northern part of the parish remained undeveloped throughout the period. Many butchers lived in the parish, and drovers who presumably supplied the Smithfield market with stock occasionally appear in the burial register. An inhabitants listing of 1677 reveals occupations of broadly similar social status to those found in Aldgate 30 years earlier, with victuallers, butchers, carpenters and tailors predominating, but there were also a moderately-sized group of titled and gentlemen residents.

The five Cheapside sample parishes of St Mary le Bow, Allhallows Honey Lane, St Pancras Soper Lane, St Mary Colechurch and St Martin Ironmonger Lane were situated in the heart of London's mercantile district, and St Mary le Bow was the most populous parish. The high wealth of these parishes in 1638 has already been discussed above. In 1693-4, Cheap Ward (in which Allhallows Honey Lane, St Pancras Soper Lane and part of the parish of St Mary le Bow was situated) had the second highest mean household rent of all 28 city wards. At £44 10s this was four times as high as in our suburban sample parishes of Aldgate (£10 14s), Clerkenwell (£12 10s), and St Margaret Westminster (£11 19s). It also exceeded rents paid even in the better-off Westminster parish of St Martin in the Fields (£24 10s) and its daughter parish St Paul Covent Garden (£34 8s).⁶ As well as housing substantial shopkeepers and merchants, lawyers, doctors and gentlemen lodged in Cheapside. Indeed, the lodgers were often a particularly high status group. Poll tax and Marriage Duty Act listings from the 1690s reveal that it was not unusual for lodgers to be taxed at a higher rate than the head of household.⁷

The spatial extent of London's mortality environment

A reasonably clear definition of the parishes comprising the metropolis is provided by the Bills of Mortality, which run in continuously weekly series from 1603 onwards, having been issued periodically at times of plague during the sixteenth century. Since the purpose of the Bills was to alert citizens to sudden rises in the death toll that presage an epidemic, it is logical to suppose that the Bills would attempt to include those parishes that were sufficiently tied to the metropolitan mortality regime to experience epidemic mortality at the same time as the urban area. In 1603 the area covered comprised all of the intramural parishes of the city of London together with those parishes wholly or partly in the liberties, extending in a wide semicircular band immediately beyond the city walls to encompass our sample parish of St Botolph Aldgate to the east, St Dunstan in the West, and also Southwark south of the River Thames. By 1604 several semi-rural out-parishes in the counties of Middlesex and Surrey were already included, including St Mary Whitechapel to the east of Aldgate, our sample parish St James Clerkenwell in the north, and our sample parish St Martin in the Fields in the west, and also Bermondsey south of the Thames. By the 1630s, the area covered by the Bills had expanded considerably in all four compass directions. To the east and west, Stepney and Westminster were now included (including our sample parish of St Margaret Westminster). To the north, Hackney and Islington had been added, and south of the Thames, Newington, Rotherhithe and Lambeth.

⁶ *ibid.*, p.176-8

⁷ Philip Baker and Mark Merry: 'For the house her self and one servant': family and household in late seventeenth-century London', *London Journal*, 34:3 (2009), p. 221

Using this chronology of parishes included within the Bills of Mortality, rapid expansion of the area considered to be within the influence of London occurred between 1603 and 1637. We might notionally term this type of expansion pioneering, since it entailed the appropriation of undeveloped rural land to the orbit of the metropolis. However, the extent to which the entirety of the more distant parishes, as opposed to their urbanised portions, reacted to metropolitan crises is unclear. Importantly, inclusion of more distant parishes in the Bills of Mortality did not require actual transfers of authority or official change of jurisdiction, but simply the cooperation of the parish clerk in compiling weekly totals in parallel with existing parish registers of baptisms and burials. Thus the Bills could respond to the changing shape of London without upsetting Londoners by infringing customary rights and privileges (unlike the guild and civic authorities when they attempted to expand the range of their commercial and legal jurisdiction). After 1637 no new land areas were added to the Bills, but a second kind of expansion becomes apparent: that of increased density of habitation. Many parishes were subdivided to create new parishes, especially in the west and east, in order to meet the administrative burden of growing numbers of inhabitants. The first such parish was St Paul Covent Garden, created from St Martin in the Fields in 1647. In 1670-94 and 1726-1746 several further new parishes formed in this way were added to the Bills.

The Bills can tell us little about changes in the period before 1603 (and numerous concerns have been raised about the reliability of their actual totals after that date, but that is largely besides the point here). In order to consider whether an area was integrated into London's mortality regime in this period we must turn to parish burial registers. Where two parishes consistently experience simultaneous peaks and troughs in the annual burial totals, we may reasonably assume they are subject to the same mortality regime. This can be judged simply by eye, by graphing the number of burials in each parish per year and comparing the shape of the plots, or through statistical comparisons of the burials time series generated by each parish. This paper will concern only the simple graphical method, as models for the second method are still currently under development.

As has been mentioned above, parishes in and around London vary greatly in size, population and in their rate of population growth. For this reason, when comparing suburban areas to Middlesex or the city, it is convenient to detrend the annual burial series to remove the effect of population growth. Thus, most of the plots that follow will represent the logarithm of the number of burials per year normalized with respect to a 12 year moving average, rather than the raw annual counts of burials. However, in order to give some feel for the relative size and growth of the sample parishes, to begin it is useful to consider the shape of the raw burials data. Figure 4 shows the annual burial totals for sample parishes in the centre of London, within the city wall, and Figure 5 shows the same information for extramural, suburban parishes. Note the differing scale of the vertical axis representing the number of burials per year in each case. In order to accommodate the data legibly, the y-axis increments are ten times greater for the populous suburban parishes of Figure 5 than the city centre parishes of Figure 4.

Figure 4

Annual burials in intramural (central) London parishes, 1540 to 1700

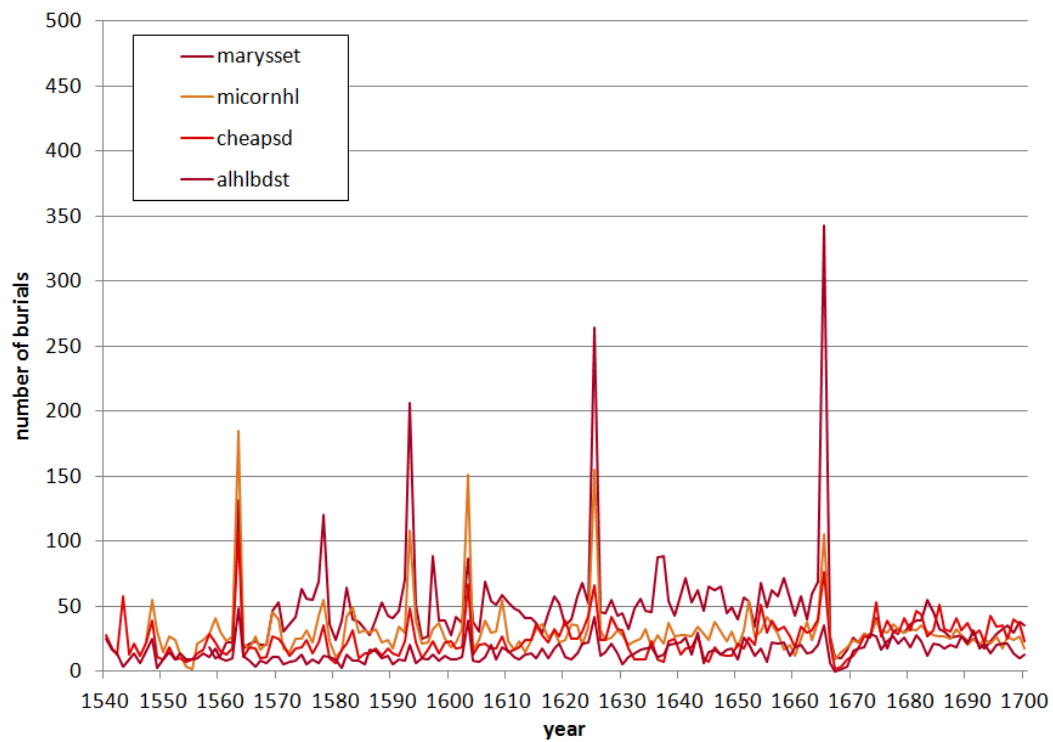
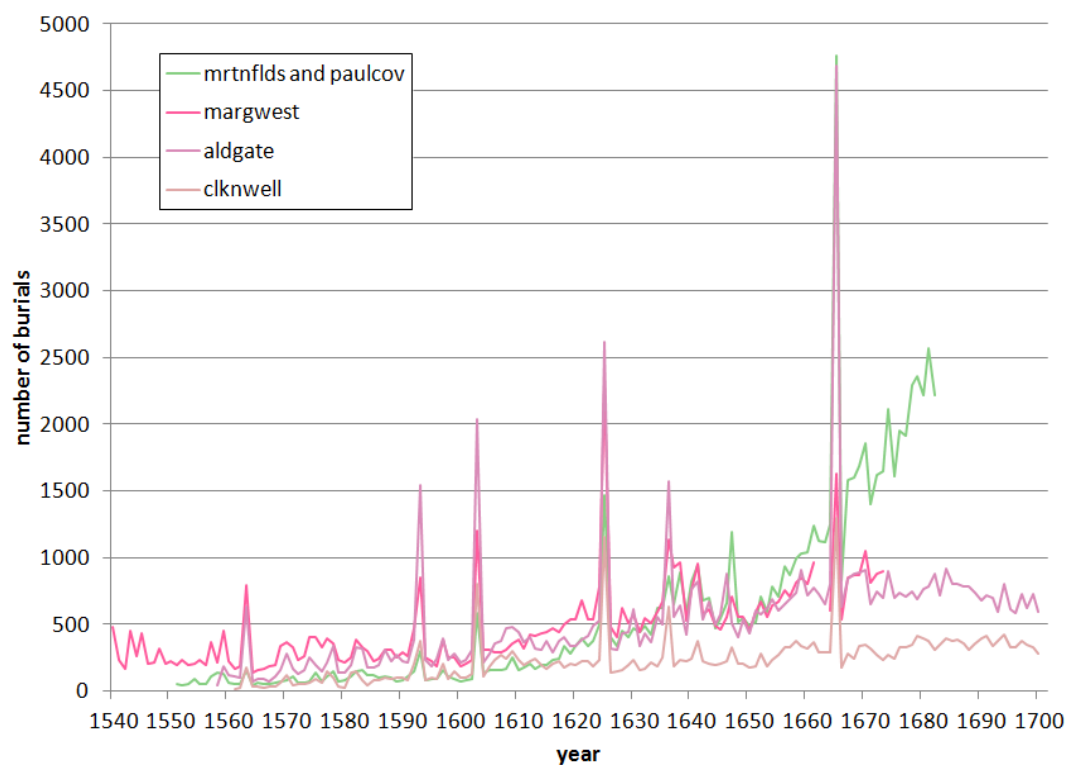


Figure 5

Annual burials in extramural (suburban) London parishes, 1540 to 1700



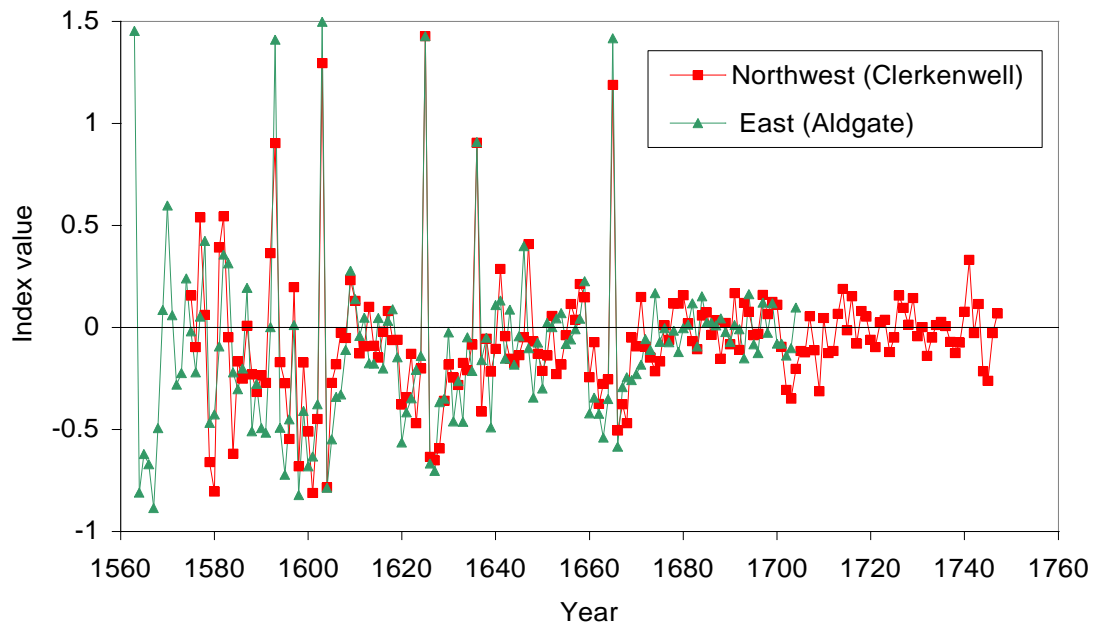
In Figure 4, Cheapside is represented by those three of the five sample parishes that were in closest accord with each other, and which were united into one parish after 1670: St Mary le Bow, All Hallows Honey Lane and St Pancras Soper Lane. In Figure 5, because St Martin in the Fields originally included the area that became its daughter parish of St Paul Covent Garden when the latter was created in 1647, the two have here been recombined.

At first glance, the most striking feature of Figures 4 and 5 are the spikes of burials in the plague years 1563, 1593, 1603, 1625 and 1665, each a monumental reminder of the hazards of living in sixteenth and seventeenth London, even for adults. A further plague outbreak in 1635/6 is evident in the suburbs and to a lesser extent in the riverside city parish of St Mary Somerset, and there were other more minor outbreaks. We shall continue to call the major outbreaks plague years for the sake of convenience, although the seasonality and spread of mortality in each year gives good reason to doubt that this was the only disease responsible for the excess mortality.⁸ Closer examination of the intervening periods between plague years among the city parishes of Figure 4 reveals a close degree of correspondence in the smaller peaks and troughs. While some parishes were more severely affected in bad years than others, the good and bad years were essentially similar in each parish, as we might expect given their close proximity and established urban environment.

In the suburbs shown in Figure 5, the similarities between parishes are harder to pick out after 1600 because of the different rates of population growth, but a good deal of correspondence is nonetheless evident, and is reinforced by the close correspondence between the detrended burials for Aldgate and Clerkenwell presented in Figure 6. From Figure 5, it is quite evident that St Margaret Westminster was integrated into the metropolitan mortality environment from an early date, long before its inclusion in 1637 in the Bills of Mortality. In the light of this, it may seem surprising that the predominantly rural parish of St Martin in the Fields that partly surrounds St Margaret Westminster had been added to the Bills more than 30 years before. However, Westminster had, of course, originally been an entirely distinct settlement from London. A portion of St Martins in the Fields stretched further east than St Margaret Westminster and was contiguous with St Clement Danes parish, which had also been included within the Bills in 1604 and was in turn adjacent to the ward of Farringdon Without, part of the city of London since medieval times. The creation of the new parish of St Paul Covent Garden in 1647 from the eastern portion of St Martin in the Fields confirms that much new development had taken place there. So, parishes were not always added to the Bills of Mortality at the point where they began to suffer the same epidemic mortality. Instead, some parishes were added to the Bills only after their densely inhabited urban portions substantially abutted the built-up area of the metropolis. Or there may simply have been more residents willing and able to pay for the information the Bills provided in St Martins than in St Margaret Westminster.

⁸ For a detailed discussion of the spread and timing of epidemic mortality in central London in plague years, see Graham Twigg: 'Plague in London: spatial and temporal aspects of mortality' in J A I Champion (ed.) *Epidemic Disease in London*, Centre for Metropolitan History Working Paper Series No. 1 (1993); for a comparison of suburban and city parishes see also Gill Newton: 'Infant Mortality Variations, Feeding Practices and Social Status in London between 1550 and 1750', *Social History of Medicine* 24:2 (2011), pp.265-8

Figure 6: Detrended annual burials in two London suburbs



Source: Aldgate and Clerkenwell parish registers

Figure 6 presents burials detrended to remove the effect of population growth for the first time, for two of the suburban parishes in Figure 5. As well as making it easier to see the close correspondence between the two series, in this plot a longer run of data for Clerkenwell has been employed, to illustrate more forcefully the change in volatility of annual burials after the disappearance of plague in 1665. Evidence on infant and child mortality presented below suggests that there may have been a brief improvement in mortality among the young after the disappearance of plague, before other diseases stepped into the gap and mortality rose once again.

However, before turning to infant and child mortality, there remains the question of how far into the rural hinterland of Middlesex parishes the mortality effect of London reached. To address this question, it is easiest to focus in particular on the most dramatic defining feature of metropolitan mortality between 1550 and 1665, the plague years. Early modern local mortality crises in England as a whole were not generally tied the same pattern as London, and Wrigley and Schofield considered those English parishes that did experience high levels of mortality during London plague years were those closest to the metropolis, or strongly connected to it by trade and transport routes.⁹ In fact the pattern is far from simple. We now consider mortality in the four plague years of 1553, 1593, 1625 and 1665 and the several years preceding and following each in different groupings of London and Middlesex parishes (Figures 7 to 10).

⁹ For a discussion of mortality crises in 404 English parishes, not including London and overlapping with the parish used in this paper only in the case of the parish of Edmonton, north Middlesex, see E A Wrigley and R S Schofield: *The population history of England, 1541-1871: a reconstruction*, Cambridge University Press (1981), pp. 645-693.

Figure 7: Detrended burials in intramural London parishes in 4 plague years compared

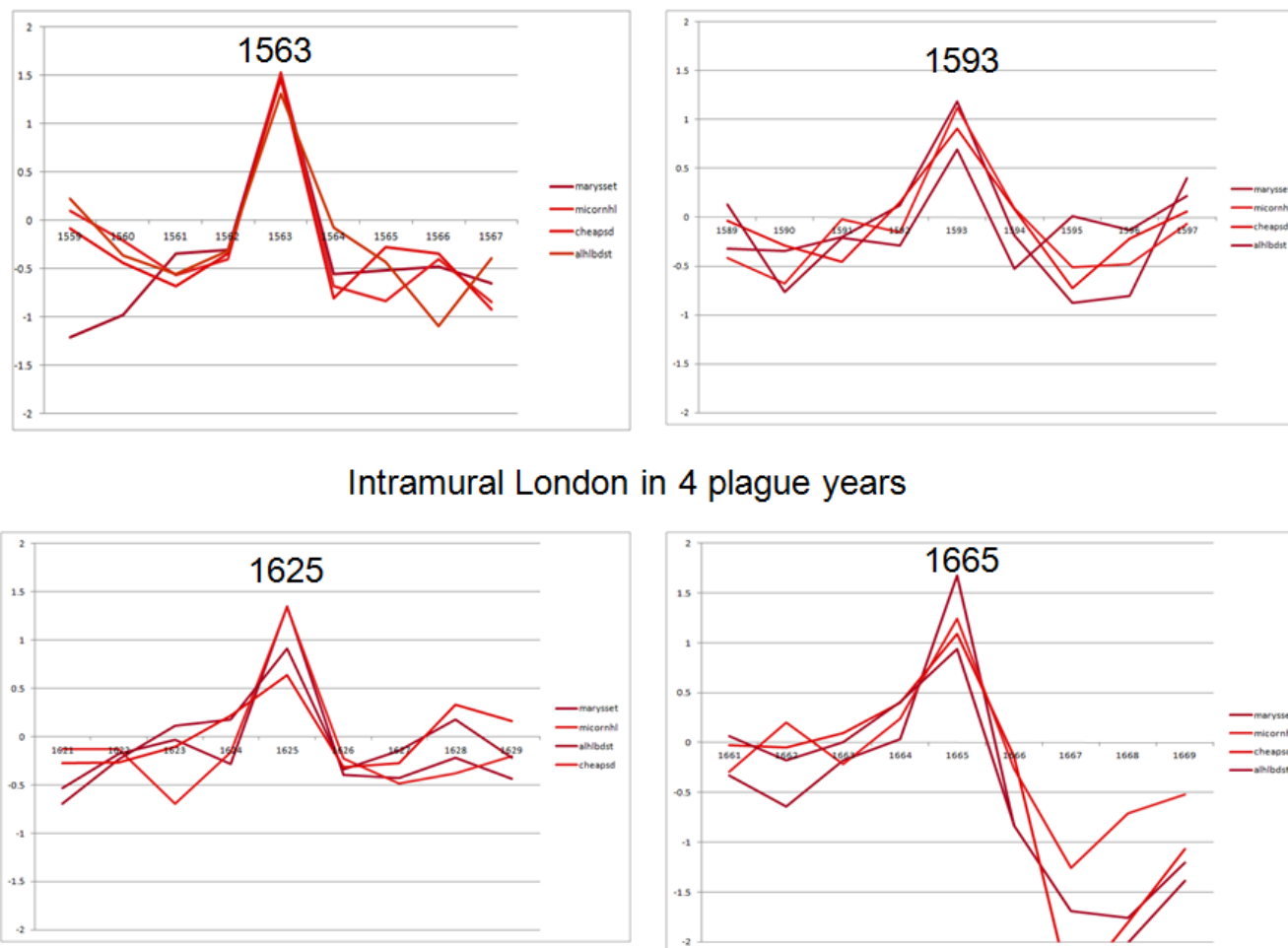


Figure 8: Detrended burials in intramural and extramural London parishes in 4 plague years compared

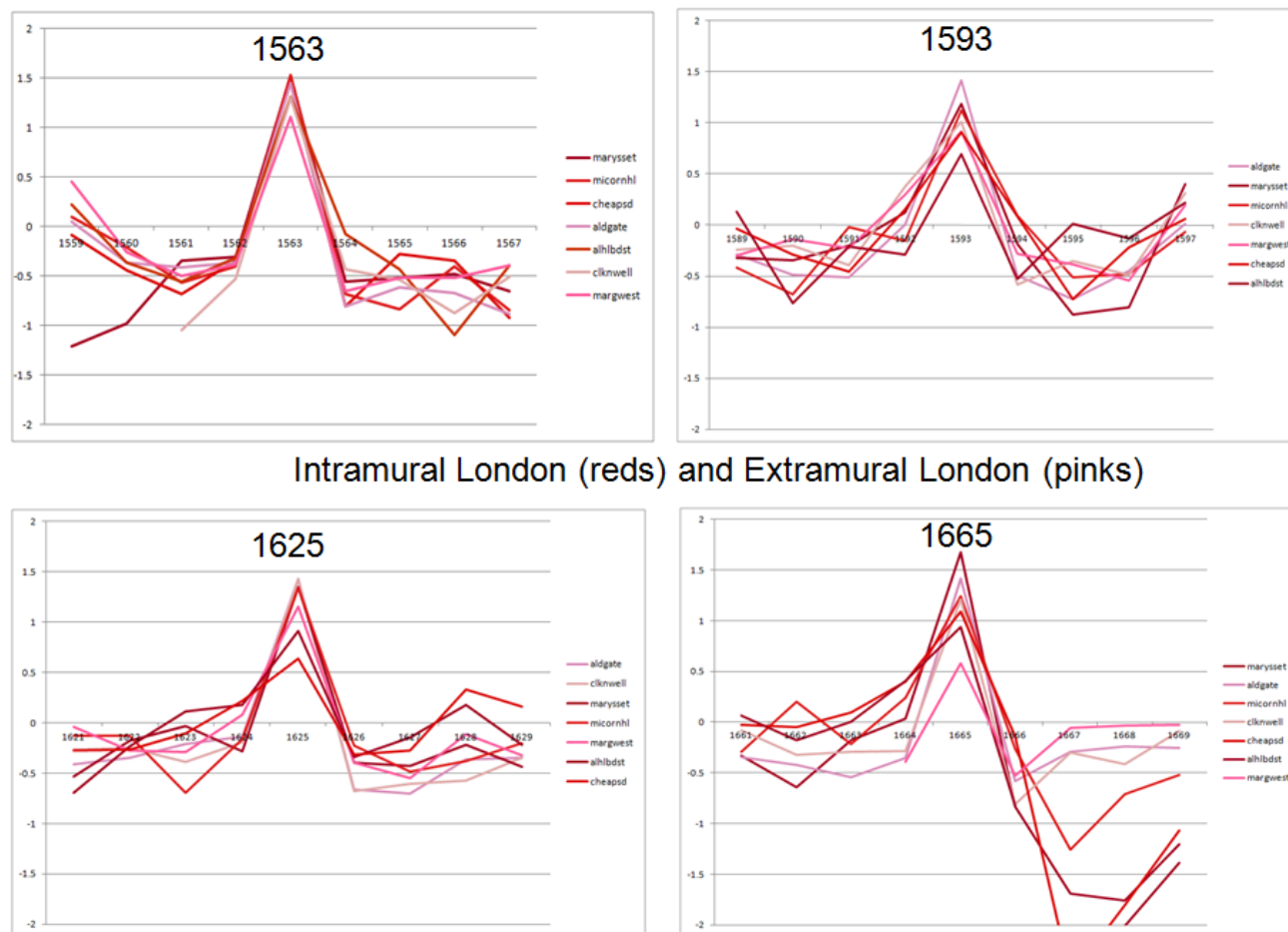


Figure 9: Detrended burials in Eastern Middlesex parishes in 4 plague years compared with the least and most reactive London parishes

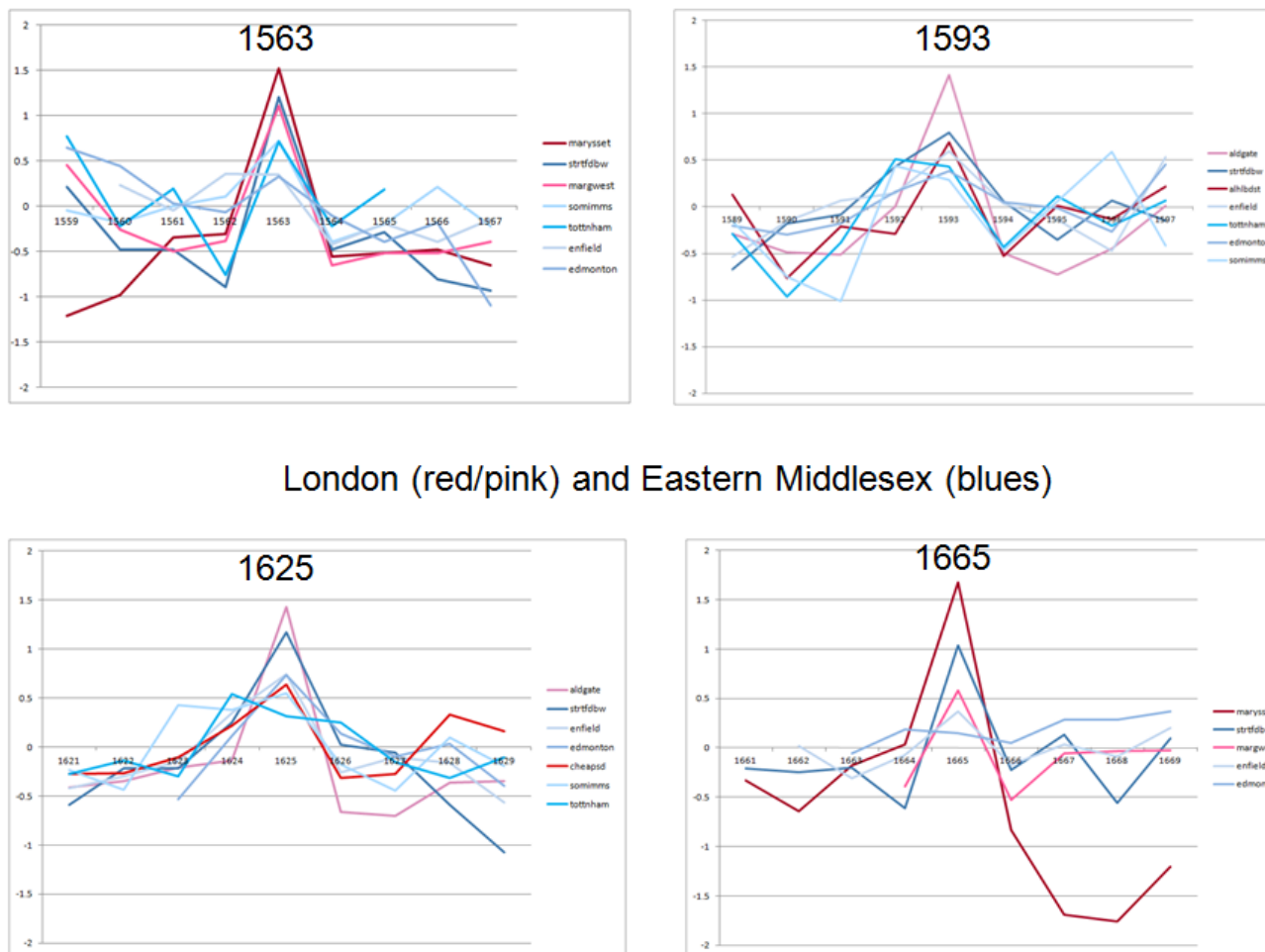
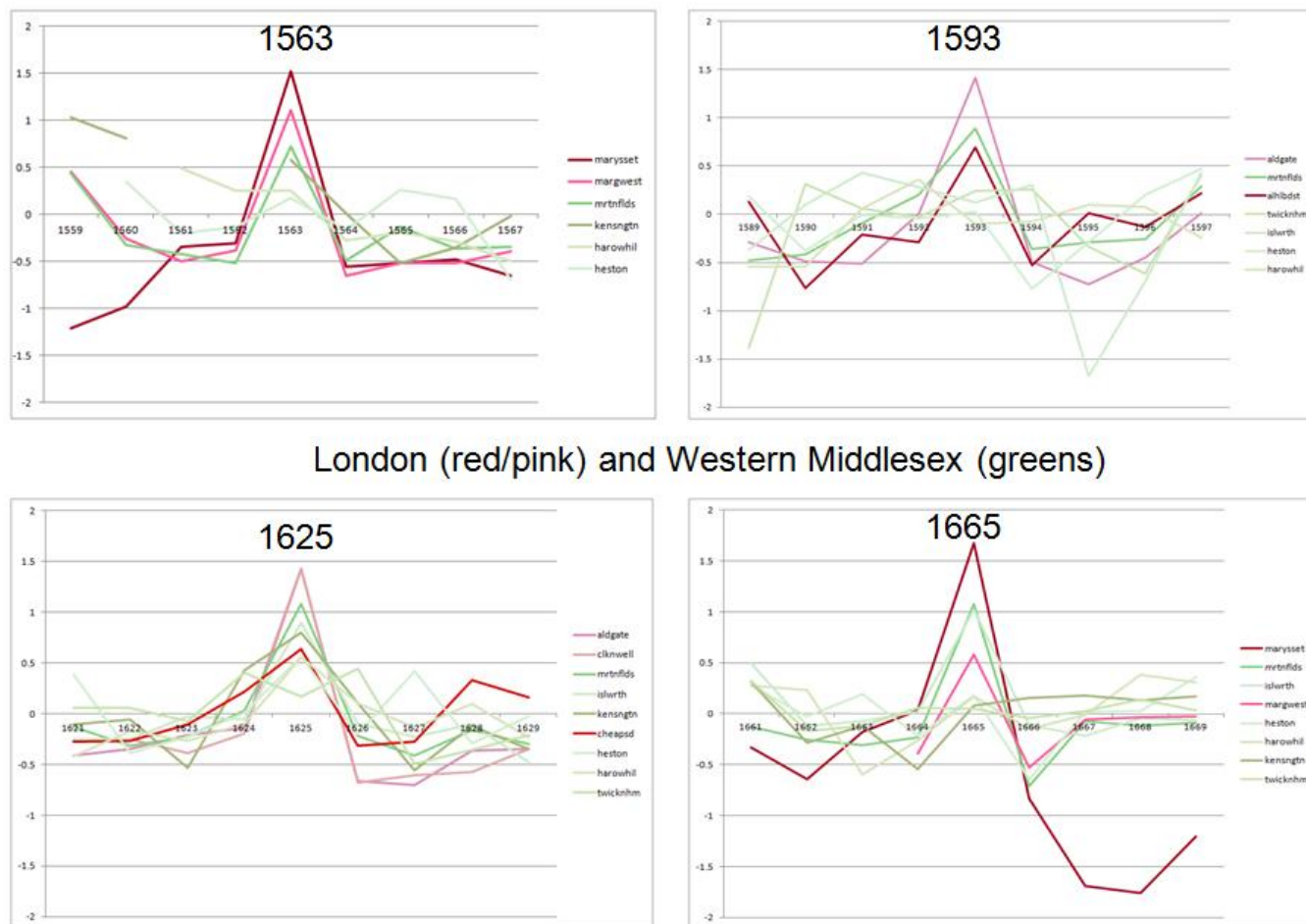


Figure 10: Detrended burials in Western Middlesex parishes in 4 plague years compared with the least and most reactive London parishes



For these four plague years, Figures 7 and 8 present in closer detail the synchronicity between burials in intramural and suburban London parishes that we have begun to explore. Figures 9 and 10 compare the least and most reactive London (suburban or central city) parish with a group of parishes in eastern and western Middlesex respectively (see Figure 2 for a map of Middlesex showing the location of these parishes). Most of the eastern and western Middlesex parishes lie far enough from the metropolis that there is little ambiguity in classing them as non-suburban. However, St Martin in the Fields is an exception. For these plague years, St Martin in the Fields has been treated as a western Middlesex parish, reflecting the physical position of most of the parish, but as we have seen it did have an urban portion, and had been included in the Bills of Mortality from an early date. It might be more accurate to consider it a suburbanising parish, particularly after 1650, as the runaway population growth hinted at by the extremely rapid rise in burials totals shown in Figure 5 above suggests. However, all but one of the plague years under consideration here precedes this growth.

The reaction of central city parishes in these four plague years is particularly useful as a starting point since it can be thought of as an experimental control. By comparing parishes that were indubitably urban, closely allied, and physically very near to each other, we can get an impression of the degree of variation to be expected between a sample of parishes that were all subject to excess mortality in each plague year, and the degree of synchronicity between them. Comparing the four mortality peaks as shown in Figure 7, change over time is immediately apparent. In 1563, the reaction of St Mary Somerset, St Michael Cornhill, the Cheapside three parishes and Allhallows Bread Street is simultaneous and almost identical, but in later plague years, especially 1625 and 1665, a greater divergence between the parishes is seen. This is partly a consequence of differing timings in the beginning of excess mortality, since in all plagues but 1593; some parishes had already begun to experience slightly elevated mortality in the year immediately prior to the peak. In such cases the prolonged mortality crisis was discontinuous. The earliest month in each plague year in which the epidemic began was March, and there was no steady rise in monthly death tolls over longer than a year, but rather a resurgence of excess mortality that had been foreshadowed the previous summer and autumn. There is also continuity over time in the ranking of the city parishes during the crisis. In the legend of each plot in Figures 7 to 10, the parishes are arranged so that the most reactive in the plague year is listed first, and the least reactive last. In each year, among the city parishes the poorer riverside parish of St Mary Somerset experienced the most pronounced peak in mortality, although often the difference was slight.

Extending the plague year comparisons to suburban parishes as shown in Figure 8, mortality similarities between extramural suburbs and intramural city centre are immediately apparent. In each period, before and during the epidemic, Aldgate, and Clerkenwell reacted within the range exhibited by the city parishes, as did the more distant St Margaret Westminster in most years. In the last plague year of 1665, recovery times after the mortality peak for the suburban parishes of Aldgate, Clerkenwell and St Margaret Westminster were markedly faster, with the three suburban parishes rebounding remarkably rapidly. The deepening trough after the plague year of 1665 in the city parishes was undoubtedly partly because the Great Fire the following year destroyed much of the built environment of these parishes and thus further delayed the rate at which they might be repopulated. However, given the

generally stagnating population levels of intramural parishes before and after this date, it was probably also a consequence of the suburban destinations of the overwhelming majority of migrants to London after 1650. Looking at the mortality peaks over time, the nearer suburban parishes of Aldgate and Clerkenwell rise up the rankings, particularly the partially river-fronting Aldgate, which alternates with the city parish of St Mary Somerset in sharing the top ranking.

We have seen that all of the central and suburban London parishes sampled shared a marked and very similar response to mortality crises in these four plague years. By this empirical measure they can all reasonably be considered to have been integrated into the same mortality regime throughout the period 1563 to 1665, even in the earliest years considered. In order to compare the London parishes to more distant parishes in Middlesex we clearly need to retain the shape of the metropolitan reaction to each crisis as a comparison, but to continue to show all seven intramural and extramural series would become unwieldy. In Figures 9 and 10 we therefore retain only the most and least reactive London parish series in each plague year.

Among the eastern Middlesex parishes shown in Figure 9, Stratford Bow is particularly striking for its mortality similarities with the metropolis, reacting much as if it were a London suburb, especially in 1563 and 1665, and being within the range set by the least and most reactive London parish in each plague year. While it is the closest of the five eastern Middlesex sample location to the metropolis, it was not contiguous with the urban extent of London in this period, nor with the River Thames. It is separated from London by the hamlets of the large parish of Stepney, which were still rural except for a band of development along the River Thames. However, Stratford Bow is adjacent to the River Lea, which was an important transport route, particularly for grain supplies entering London from Hertfordshire. The other four eastern sample parishes of Tottenham, Edmonton, Enfield and South Mimms also border the River Lea, forming a contiguous progression further north along the county boundary with Essex and eventually Hertfordshire, but the main settlement in each case is not so close to the river as at Stratford, so any effect caused by proximity to river cargoes and their transporters could be expected to be more slight. For the plagues of 1593 and 1625, there are intriguing indications of excess mortality in the eastern Middlesex parishes of South Mimms and Tottenham (and in 1593, Stratford Bow also) that anticipate London by up to two years. The extent to which these parishes might be integrating with the metropolitan mortality environment is much less clear-cut than with the suburban parishes. In none of the four plague outbreaks do all react as London does, but there is coincident elevated mortality in all but the last plague of 1665, when at least two of the five parishes have registration problems.

In western Middlesex, on the evidence of the four epidemics, St Martin in the Fields is the most reactive parish, although in 1563 it is not yet on a par with the London parishes. By 1593 it stands out as being similarly integrated into the metropolitan disease environment as we observed throughout the period for Stratford Bow among the eastern Middlesex parishes. As discussed above, by the seventeenth century at least, St Martins has much stronger links with the metropolis and indeed constitutes a suburb by the Bills of Mortality's *de facto* definition, so in many respects this is unsurprising, but the weaker reaction of St Martins in 1563 allows us to tentatively place the timing of its integration into the metropolitan mortality regime as being of relatively recent origin (it also reacts in the same way as suburban London in the 1603

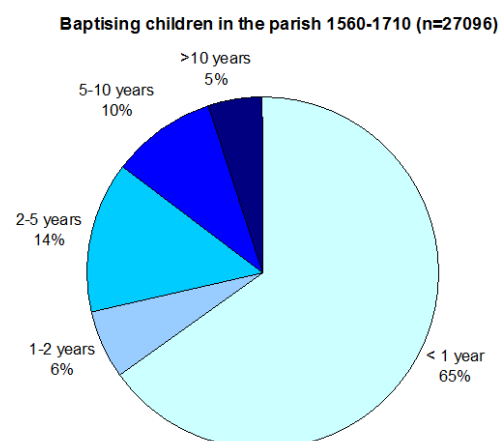
plague epidemic not shown in these figures). The reaction of St Martins near neighbouring parish further west of Kensington is puzzlingly varied, being almost equivalent to St Martins in 1563 and 1625 but much less reactive in 1665. However, Kensington is subject to a number of registration hiccoughs that cast some doubt on the conclusions drawn from the evidence of these four plagues alone. Among the parishes deeper into the western rural hinterland of Middlesex, only Isleworth displays a strong reaction to the same mortality crises as the metropolis, and in general there is less similarity than with the eastern Middlesex parishes along the River Lea. Isleworth is, in fact, the next closest sample parish to Kensington along the River Thames, adding more weight to the suggestion of an association particularly between river transport and plague mortality, and perhaps mortality in general.

A great deal of further work on the similarities and differences between the annual and monthly totals of burials London and its hinterland, and indeed elsewhere in England, remains to be done, including more sophisticated statistical analyses. It is hoped this section may serve as a 'taster' of the kind of questions that the burials data may eventually address and for the meantime, suggest some tentative parallels and hypotheses. Having considered the spatial influence of the metropolis on mortality in the surrounding area, we now turn to focus in more detail on the level of mortality experienced by London's younger inhabitants, in those sample parishes for which family reconstitutions that linking parish burial records to baptisms and marriages have been completed.

Infant and child mortality in London

The advantage of using reconstituted families derived from parish register baptisms, burials and marriages to calculate infant and child mortality is that the population at risk of dying is known. By reference to the latest event recorded by each family, we can determine whether or not a child's family was resident in the parish for at least a year after its birth. This allows us to control for the effect of population turnover. Infants and young children are particularly susceptible to the elevated levels of infectious disease and environmental hazards we might expect to find in a fast-growing urban area without sanitary provision, because their immune systems are relatively undeveloped. They are also the group best suited to analysis in a high mobility urban environment, where the degree of population movement both within and to and from the metropolis is sufficiently great as to make estimates of mortality among older children or adults much less reliably representative of all Londoners, since it would have to be limited to the small minority of families that had stayed in one parish for a considerable number of years or decades. Figure 11 illustrates the length of residential persistence in Aldgate among those families that baptised children between 1560 and 1710 (persistence was relatively invariant over time).

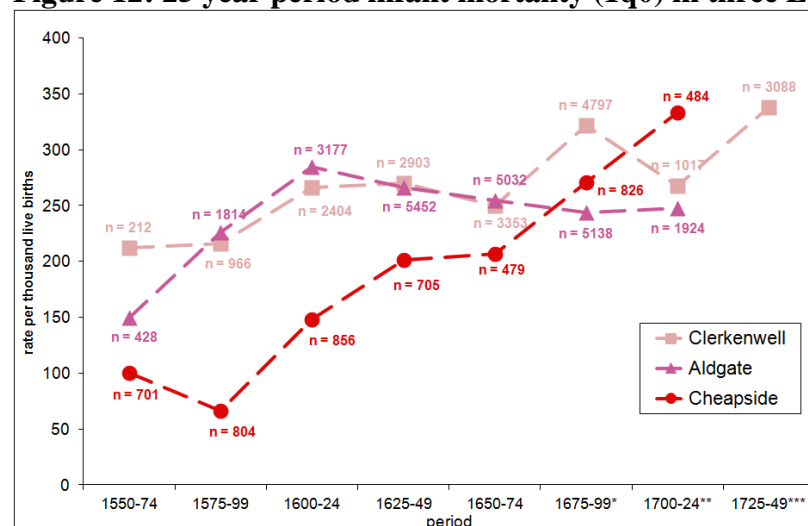
Figure 11: Residential persistence among childbearing couples in Aldgate



Source: Aldgate family reconstitution

The long term trend in infant mortality (those dying in the first year of life) between 1550 and 1750 derived from our three family reconstitution sample areas of Aldgate, Clerkenwell and Cheapside is shown in Figure 12, together with the number of children at risk of dying in each period on which the rate is based. For the century between 1575 and 1674, the suburbs of Clerkenwell and Aldgate experienced very similar, high levels of infant mortality of between 200 and 250 per thousand. Thereafter some divergence is apparent, with the northern suburb of Clerkenwell exhibiting rising levels of infant mortality after 1675 while that in Aldgate declined slightly. In the central Cheapside area, infant mortality also rises steeply. However, the true level of infant mortality in Cheapside at the beginning of the period was almost certainly higher than it appears, and probably comparable to that of Aldgate, since infants from these wealthy parishes were nursed and died outside the parish and were thus omitted from the burial register.¹⁰

Figure 12: 25 year period infant mortality (1q0) in three London sample areas

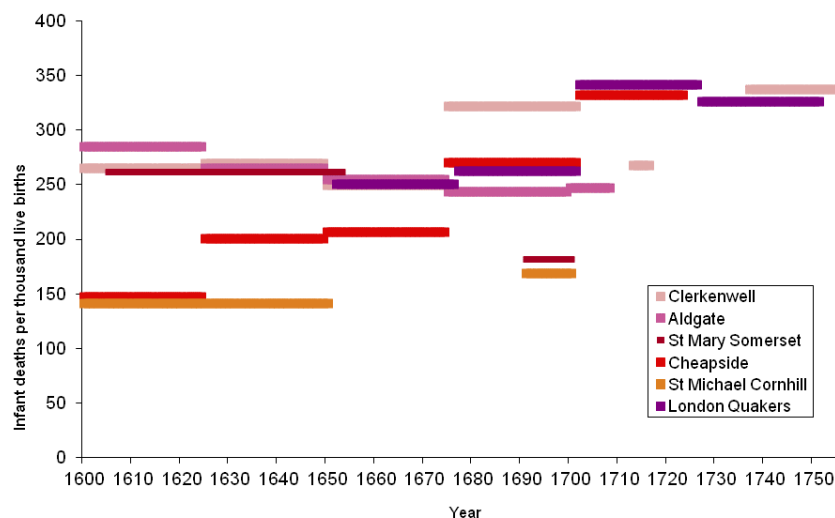


Source: Aldgate, Clerkenwell and Cheapside family reconstitutions

¹⁰ For a fuller discussion of the issue of nursing outside the parish and its effect on observable levels of infant mortality in the Cheapside parishes, see Newton *op. cit.* pp. 268-277.

Figure 13 places these results in the context of other London studies, beginning at a later date so as to discard the implausibly low sixteenth century infant mortality rates obtained for Cheapside, as a consequence of children being nursed outside the parish. However, Finlay's rates for the wealthy intramural parish of St Michael Cornhill were calculated for one period beginning in 1580 and will thus continue to be subject to the same issue to some extent. As mentioned above, most of the London Quakers were suburbanites resident in Southwark and Surrey parishes south of the river Thames, with the remainder resident in north western parishes fringing the city, including Clerkenwell. We may therefore take Aldgate, Clerkenwell and the Quakers to represent suburban London and the Cheapside five parishes together with St Michael Cornhill and St Mary Somerset, to represent central London. Except in two cases, the evidence suggests convergence in infant mortality over the seventeenth century, in areas of the metropolis where very different levels of wealth and housing quality predominated. The two exceptions are St Michael Cornhill and St Mary Somerset. Landers considered the low rates obtained by Finlay for these parishes to be highly suspect, especially in the 1690s, and certainly they do not fit very well with any pattern of convergence, or with one of rising infant mortality in the case of St Mary Somerset. However, there is a hint of a secondary pattern concerning the fall in infant mortality experienced by some parishes. In both Aldgate and St Mary Somerset infant mortality appears to have peaked early and to have been falling by 1700, although it may have risen thereafter.

Figure 13: London infant mortality (1q0) between 1600 and 1750

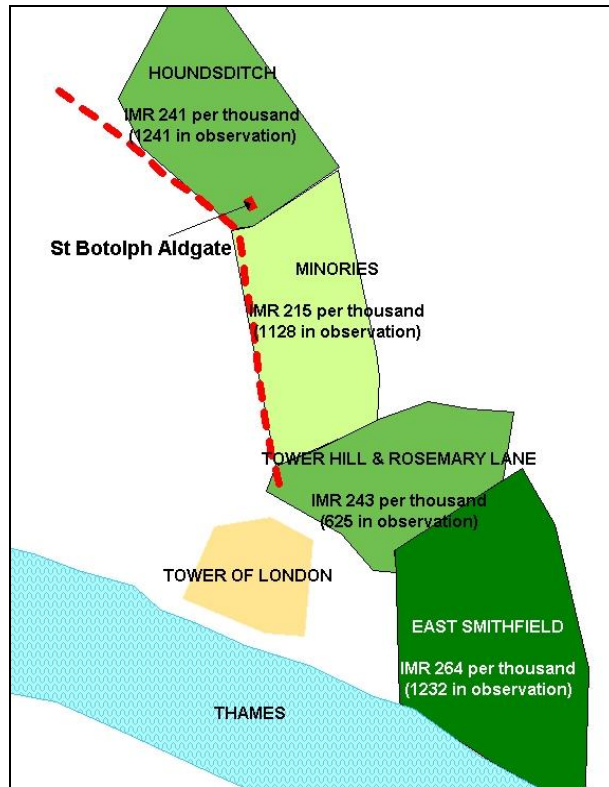


Sources: Clerkenwell, Aldgate and Cheapside family reconstitutions; for St Mary Somerset and St Michael Cornhill, Finlay *op. cit.* p. 35 and p. 85; for the London Quakers, Landers *op. cit.* p. 140.

We noted in the previous section the association between plague mortality and proximity to rivers, and it is interesting to consider the improving trajectory of infant mortality in some parishes in the light of this, remembering that plague eventually died out over the course of the seventeenth century London. Both Aldgate and St Mary Somerset had parts directly adjacent to the Thames, and both experienced some improvement in infant mortality by the late seventeenth century. But even after 1690, in Aldgate infant mortality was noticeably worse close to the river, as Figure 14 illustrates. While Southwark also fronts onto the river, the Quakers from the sample

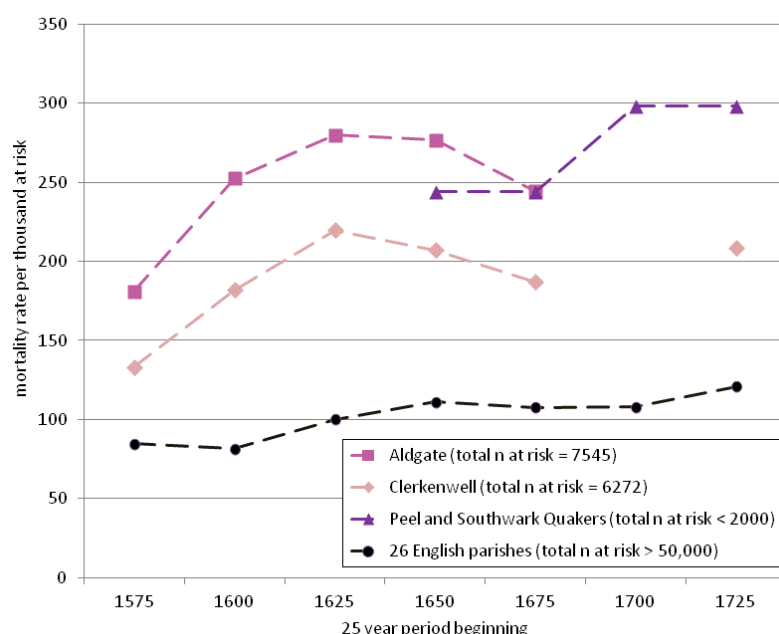
represented in Figure 13 who lived in Southwark probably had the means to reside in streets further inland.

Figure 14: The geography of infant mortality in St Botolph Aldgate between 1690 and 1709 from street addresses given in the baptism and burial registers



The two largest family reconstitution datasets, those for the suburbs of Aldgate and Clerkenwell, have also been used to calculate child mortality – that is, the proportion of children who died between their first and fifth birthdays. These rates are presented in Figure 15 alongside those obtained by Landers for the same Quaker population whose infant mortality has been discussed above, and also those obtained by Wrigley *et al* for England as a whole from 26 rural and market town sample parishes. (Note that the long-established Quaker estimates of London child mortality are based on smaller numbers of births than those available from the Clerkenwell or Aldgate family reconstitutions- as, indeed, are the Quaker infant mortality estimates discussed above). Both Clerkenwell and Aldgate here clearly demonstrate the early seventeenth century peaking in mortality that was also apparent in infant mortality in Aldgate, followed by a modest improvement until 1700 or 1725, and a renewed worsening thereafter. The Quakers confirm and continue the rising trend in child mortality after 1700 (1700 to 24 estimates for Clerkenwell have not been attempted because of a lapse in registration quality in the burial register throughout this period that renders accurate record linkage problematic). Over the same period, child mortality in the 26 parish sample representing England as a whole is much lower and changes far less, but also consists of a rise in two stages, in this case separated by a plateau rather than a fall in child mortality. If this is taken to be a muted variation on the London pattern, then it comes at a quarter-century lag after the metropolis.

Figure 15: Child mortality rates (4q1) in London and England between 1575 and 1749



Source: Aldgate and Clerkenwell family reconstitutions and E A Wrigley *et al*: English Population History from Family Reconstitution 1580-1837, Cambridge University Press (1997) p. 262.

Whereas we have seen that a higher proportion of infants died in Clerkenwell than in Aldgate in the seventeenth century, a higher proportion of children aged between 1 and 4 years died in Aldgate. It seems Aldgate was the more hazardous environment for those children who survived to experience its full effect after the protective effects of breastfeeding had ceased, but Clerkenwell had a weaker stock of infants at birth. Infants are more likely to die if the mother's health is compromised, whereas older children who have been weaned are more at the mercy of circulating pathogens in the environment. Migrant mothers who had left deteriorating conditions in rural areas to travel to the metropolis could well have arrived in poor health, but whether there was differential migration to these two suburban areas is difficult to ascertain, still less whether unhealthy migrants were more likely to settle in one suburb than another. However, we can say, given Clerkenwell's location relative to the rest of England, that for those who arrived on foot to settle in the metropolis probably encountered Clerkenwell on arrival in larger numbers than they did Aldgate. To arrive by boat up the Thames would of course have required funds to pay for the passage. Rather than taking primarily absolute newcomers to the city, once the international waves of migration that characterised the sixteenth century had passed, Aldgate probably accommodated more migrants on their first or subsequent removal within the city, by which time they had had perhaps earned sufficient means to restore their health.

At this point it is useful to reconsider the degree to which these two areas we have categorised as suburban were at the fringe of the metropolis, especially by 1700 or later, and their connections to the wider world, and any other differences between them that might have impacted on health. Clerkenwell was part-urban, part rural even as late as 1805, and as such represented a wider range of habitation density, although the overwhelming majority lived at the crowded city end. Drovers and their cattle

traversed the parish in order to reach the Smithfield market, perhaps bringing disease with them, but movements of people, cattle and goods through the parish were by road and from elsewhere in England rather than further afield, and the parish was not quite a terminus. Aldgate had ceased to be meaningfully at the edge of the urban extent over the course of the seventeenth century. However, exposure to new pathogens was likely to be more frequent and more direct in a parish so close to the River Thames and its docks, which employed many sailors and labourers and from where both visiting people and shipments of goods arrived and departed, connecting London with Europe and the rest of the world. Both parishes would have had reasonable access to food, in common with the rest of the metropolis, but water supplies to each of them differed. Since infants drink maternal milk (presuming they are breast-fed), contaminated water ought to have had a greater effect on older children. In Aldgate, water drawn from the Thames was almost certainly insalubrious, whereas Clerkenwell had many springs and wells, and was chosen for the site of the New River head from which supplied much of north London with water from upstream of the sewage and industrial pollutants of the city.

Conclusion

We have considered the chronology of shared mortality experience in London, first in broad outline by reference to the dates at which parishes were added to the Bills of Mortality, and in considerably more detail through comparisons of the annual totals of burials, especially during epidemics. From the Bills of Mortality, the period between 1603 to 1637 emerges as the one of greatest contemporary concern with extending the geographical coverage of the Bills, and it is in this same period that a dramatic climb in child mortality in particular is evident in our sample suburban parishes. However, life in the metropolis was at all times more hazardous than elsewhere in England and extended even further than the Bills accounted for. It is evident that in plague years the urban mortality regime often impinged on rural Middlesex, particularly in parishes with river access to London. But intriguingly, London plague years could also be anticipated in some of these more distant parishes, raising questions about the wider transmission routes of infectious disease. After 1665, when plague disappeared, the annual volatility in burials totals in the London suburbs decreased, at least initially, and several parishes showed some improvement in mortality among the young for a brief period, before other diseases, most probably smallpox especially, exerted a heavier toll.

We have also presented new data on infant and child mortality in London over the early modern period, when the city was developing its economic identity and rising to prominence in Europe. During this period London proved powerfully attractive to migrants, at first from abroad and at all times from elsewhere in England, despite the greatly increased risk to health of living in London. Indeed, a flood of new migrants was essential to replenish the workforce of the metropolis, for infants and children born there had very poor survival prospects and periodic epidemics killed off many adults besides. We have seen that in the first half of the eighteenth century, infant mortality worsened substantially in the suburbs and the city centre to figures exceeding 300 per thousand. In the century and a half preceding this nadir, more divergent patterns of mortality experience among the youngest are evident, but child mortality for those aged 1 to 4 years had already exceeded 250 per thousand by 1625 in some suburban parts of the metropolis.